Horticulture Marketing: A Comparative Study of Grapes and Pomegranate Crops in Bagalkot District of Karnataka State

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Introduction

India has had a predominantly agrarian economy since time immemorial. The agriculture sector continues to play a fundamental role in the lives of rural populations (Srivastava, Saxena, & Nangia, 2016). Although agriculture remains the primary livelihood for a significant portion of the population, its contribution to national income is currently about 14%, while approximately 62% of the population depends on agriculture for their livelihood.

Horticulture is a vital component of the broader agricultural system. It is one of the fastest growing and most productive sectors in India, characterized by high productivity, better returns, and greater potential for employment generation and exports, comparatively lower water requirements, and adaptability to adverse soil and wasteland conditions. While the early Five Year Plans prioritized achieving self-sufficiency in food grain production, over time, horticulture has emerged as an indispensable part of Indian agriculture, offering farmers a wide range of options for crop diversification (Planning Commission, Government of India, 2007).

Horticultural production has increased thirteen times, from 25 million tonnes in 1950–51 to 331 million tonnes in 2020–21, surpassing food grain production. Despite occupying only 18% of the agricultural area, the horticulture sector contributes approximately 33% of the gross value added to agricultural GDP. While the Indian Council of Medical Research (ICMR) recommends a daily intake of at least 92 grams of fruit per person, the actual per capita consumption in India is only around 46 grams per day.

Background of the Study

It is a well-established fact that India has had a predominantly agrarian economy since time immemorial. The agriculture sector occupies a fundamental position in the lives of rural populations (Gowda et al., 2018). Although agriculture continues to be the primary source of livelihood for a significant portion of the population, its current contribution to the national income is about 14 percent, while approximately 62 percent of the population depends on it.

Horticulture is a vital component of land-based agricultural systems. It is one of the fastest growing and most productive sectors in the country. Horticultural crops are characterized by high productivity, better returns, greater potential for employment

generation and exports, comparatively lower water requirements, and adaptability to adverse soil and wasteland conditions. The input-output ratio in most horticultural crops is significantly higher than that of traditional field crops (Singh, Chandra, & Sharma, 2019). Additionally, these crops play an important role in improving the environment.

In India, the horticulture sector includes a wide range of crops such as fruits, vegetables, tuber crops, ornamental plants, medicinal and aromatic plants, spices, and plantation crops. While the initial Five-Year Plans focused primarily on achieving self-sufficiency in food grain production, over time, horticulture has emerged as an essential component of agriculture, offering farmers diverse options for crop diversification (Planning Commission, 2007). Currently, the horticulture sector contributes approximately 24.5 per cent to agricultural GDP, while occupying only about 8 per cent of the total cultivable area.

Statement of the Problem

Horticulture, which includes the cultivation of fruits, vegetables, and flowers, is vital both globally and in India due to its central role in daily life and nutritional security. Despite being the world's second-largest producer of fruits and vegetables, India faces lower productivity compared to other nations, largely due to various systemic challenges. Nevertheless, horticulture has become a major economic driver, contributing around 24.5 percent to India's agricultural GDP while utilizing just 8 per cent of the cultivated land.

In recent years, India has emerged as a leading producer and exporter of coconut, tea, coffee, cashew, and spices. However, challenges remain, particularly in ensuring fair prices for farmers. Many farmers operate on small, fragmented landholdings and depend heavily on rainfall. Although Agricultural Produce Marketing Committees (APMCs) have improved market infrastructure, middlemen continue to dominate the marketing of fresh produce. Recently, private sector participation in horticulture has grown, with companies establishing retail chains, malls, cold storage facilities, and contract farming arrangements to support farmers and reduce inefficiencies in the supply chain.

Historically, agriculture has deep roots in India. Evidence suggests that rice and cotton were cultivated during the Indus Valley Civilization. Archaeological excavations at Kalibangan in Rajasthan have revealed Bronze Age cultivation patterns. Moreover, the ancient Sanskrit text Bhumivargaha, written approximately 2,500 years ago, classified agricultural lands into twelve categories based on fertility and environmental characteristics. This early classification reflects a sophisticated understanding of soil types and agricultural suitability.

Early Crop Cultivation and Domestication

The text details the early domestication and cultivation of crops in India. It mentions that rice cultivation likely began along the banks of the Ganges as early as the sixth millennium BCE.

Spread of Agricultural Practices

Agriculture in ancient India was not confined to the fertile plains of the north but spread extensively across the Indian peninsula between 10,000 and 3,000 years ago. Excavations in southern Indian states like Tamil Nadu, Andhra Pradesh, and Karnataka provide evidence of agricultural practices involving pulses, millets, wheat varieties, barley, sorghum, pearl millet, cotton, and other crops.

Modern Agricultural Developments

Transitioning to modern times, the text discusses India's agricultural progress post-independence. Despite challenges and periods of stagnation, India achieved significant milestones in food security and production. The Green Revolution, initiated in the 1960s, was a transformative phase marked by the adoption of high-yielding crop varieties and improved farming techniques, particularly in states like Punjab. This revolution propelled India to become self-sufficient in food grain production by the 1970s.

Contemporary Challenges and Policy Shifts

In recent decades, Indian agriculture has faced challenges such as inadequate irrigation infrastructure, groundwater depletion, and the urgent need for modernized farming practices and sustainable approaches.

Economic and Global Standing

India remains a major global agricultural player, ranking among the top producers of crops like wheat, rice, pulses, cotton, fruits, and vegetables. Despite the decline in agriculture's share of GDP due to rapid growth in the industrial and service sectors, agriculture continues to contribute significantly to the Indian economy and export earnings.

Irrigation Infrastructure in India

India's irrigation infrastructure is extensive and diverse, comprising major and minor canals, groundwater well-based systems, tanks, and rainwater harvesting projects. Approximately 39 million hectares of cultivated land in India are irrigated by groundwater

wells, while an additional 22 million hectares are irrigated through canal systems. Despite these efforts, as of 2010, only about 35 percent of agricultural land in India was reliably irrigated, indicating a significant reliance on monsoon rains for crop cultivation.

Global Agricultural Significance

India ranks among the top global producers of various crops, including wheat, rice, pulses, cotton, peanuts, fruits, and vegetables. The country holds notable distinctions, such as having the largest herds of buffalo and cattle, being the largest producer of milk, and possessing one of the largest and fastest-growing poultry industries in the world. India's irrigation infrastructure has evolved significantly over the years, contributing to improved agricultural productivity and food security.

Roots of Time: Exploring Historical Backgrounds

The separation of horticulture from agriculture as a distinct activity is generally dated to the Middle Ages in Europe. Although horticulture and agriculture share many practices such as weeding, fertilizing, and watering, horticulture is distinguished by its specialized techniques and focused cultivation of plants for non-food purposes like aesthetics, ornamentation, and medicinal use. Scholars have found evidence that around 20,000 years ago, hunter-gatherers began the gradual process of domesticating wild plants and animals through trial and error. Over thousands of years, humans transitioned from a nomadic lifestyle of food collection to settled food production.

Flourishing Fields: Exploring India's Vibrant Horticultural Landscape

Horticultural crops cover a wide variety of fruits and vegetables, flowers, plantations, spice crops, medicinal and aromatic plants, roots, and tuber crops. Fruits are among the oldest known foods consumed by humans. Fruit cultivation is as old as human civilization itself (Singh, Chandra, & Sharma, 2020). The cultivation of fruits plays a vital role in contributing to a nation's prosperity. Fruits and vegetables are the prime sources of essential vitamins and minerals, which are critical for maintaining health and preventing disease. The Indian Council of Medical Research (ICMR) recommends the daily consumption of at least 92 grams of fruits per person; however, the per capita fruit consumption in India is only 46 grams per day.

The total production and economic value of horticultural produce such as fruits, vegetables, and nuts have doubled in India over the ten-year period from 2002 to 2012. In 2012, horticultural production exceeded grain output for the first time. By 2013, India's total

horticultural production reached 277.4 million metric tons, making it the second-largest producer of horticultural products after China. This included 81 million metric tons of fruits, 162 million metric tons of vegetables, 5.7 million metric tons of spices, 17 million metric tons of nuts, and plantation products such as cashew, cacao, and coconut. India also produced 1 million metric tons of aromatic horticultural produce and 1.7 million metric tons of flowers, including 7.6 billion cut flowers (Farooq & Gill, 2022).

History of Horticulture in India

The practice of gardening and managing cultivated spaces has deep roots in the Indian subcontinent, closely tied to scientific advancements. Over time, horticulture evolved separately from agriculture, becoming a specialized discipline combining both art and science. According to Edwina von Baeyer (1990), the distinction between agriculture and horticulture is generally credited to the Middle Ages in Europe. Although Mughal rulers engaged in gardening and plant cultivation, a major step toward organized horticulture came in 1820, when Reverend William Carey, a British Baptist missionary, established the Agri-Horticultural Society of India (Subrahmanyam, 1981).

Horticultural Development in India after Independence

The society has continued its efforts to introduce improved strains of cereals, vegetables, and fruit trees. After India attained independence, the National Horticulture Board (NHB) was established in April 1984 by the Government of India based on recommendations from the "Group on Perishable Agricultural Commodities," headed by Dr. M. S. Swaminathan (NHB, 2021). The main objectives of NHB include fostering the integrated development of the horticulture industry and facilitating the production and processing of fruits and vegetables. One of its major goals is to ensure the availability of quality planting materials by promoting the establishment of scion and rootstock banks, nurseries, and accreditation systems. The Indian Institute of Horticultural Research also plays a central role in research concerning fruits, vegetables, ornamental plants, and medicinal crops.

Transforming Horticulture: Karnataka's Agricultural Rise

Karnataka has become a leader in India's horticulture sector due to its diverse agro-climatic zones supporting year-round fruit cultivation. The area under fruit crops increased from 1.41 lakh hectares in 1978–79 to 2.60 lakh hectares in 2001, reflecting a 184% growth. Similarly, fruit production rose from 23.41 lakh metric tons to 41.65 lakh metric tons, marking a 178% increase (Nagaveni et al., 2024). At the national level, Karnataka plays a

crucial role in horticulture with 18 lakh hectares under cultivation, producing 136.38 lakh tons. Despite accounting for only 14.44% of cultivated area, horticulture contributes over 40% to Karnataka's agricultural income and about 17% of its GDP (Gowda et al., 2018).

Horticulture Development in Bagalkot

Bagalkot district in northern Karnataka spans 6,588 sq. km across six administrative blocks. With a gross cropped area of 588,622.93 hectares and a net sown area of 467,399 hectares, agriculture is central to its economy. Major crops include jowar, maize, bajra, groundnut, sunflower, and pulses. Despite challenges like land submergence from the Upper Krishna Project and recurrent droughts, the district maintains a cropping intensity of 125.9%. Three rivers aid irrigation infrastructure, with 274,000 hectares (58.5% of the net sown area) under irrigation. Bagalkot hosts nine sugar factories and possesses notable mineral and tourism potential. Recently, the district has emerged as a horticultural hub, particularly for grapes, pomegranates, and sapotas. These crops provide more profitable alternatives to traditional ones, supported by favourable climatic conditions and strong market demand. However, issues persist in production economics, quality management, market access, and transportation, with insufficient infrastructure for effective post-harvest handling and marketing (Farooq & Gill, 2022).

Horticulture Profit Trends: Grape and Pomegranate Farming in Bagalkot

A. Grape: Bagalkot is a prominent grape-growing district in Karnataka due to its favorable climate of cool winters and warm summers. Its reputation as a horticultural hub is attributed to high yields and premium fruit quality. Yet, studies addressing grape production and marketing costs are insufficient, limiting farmers' access to strategic insights for investment and profitability (Nagaveni et al., 2024).

B. Pomegranate: Bagalkot is also recognized for its pomegranate cultivation, ranking high in both area and output in Karnataka. Favourable climatic conditions support this growth. However, like grape cultivation, comprehensive studies on production and marketing costs are lacking. The marketing system is often criticized for being exploitative, where intermediaries benefit more than the producers or consumers (Farooq & Gill, 2022).

Research Problems and Issues

Grapes and pomegranates are commercially important horticultural crops. Their cultivation requires significant capital, skills, management, and marketing acumen. Farmers

face multiple challenges—from sowing to managing production and marketing costs. For cultivation to be sustainable and beneficial, returns must outweigh the costs. This study seeks to analyse the key challenges faced by grape and pomegranate growers in Bagalkot district.

Schematic View of the Study

This study focuses on the horticultural economy of Bagalkot District in Karnataka, examining two key crops: grapes and pomegranates. Grapes are mainly cultivated for fresh consumption and wine production, while pomegranates are valued for their health benefits and are sold both as fresh fruit and in processed forms such as juice. The study's main goal is to compare the economic impacts and marketing strategies of these two crops. Understanding how these crops are grown, marketed, and sold is vital for improving their contribution to the local economy and ensuring farmers can maximize their profits. By examining cultivation practices, production costs, and marketing strategies, the study aims to optimize the economic potential of these crops.

Chapter Scheme

The study is divided into five chapters, each focusing on different aspects of grape and pomegranate production and marketing in Bagalkot District, Karnataka:

Chapter I: Introduction

This chapter introduces the study by outlining its purpose, objectives, and hypotheses. It discusses Indian horticulture, with a focus on Karnataka and Bagalkot. The chapter identifies the research gap, presents a schematic of the study, and emphasizes the importance of horticulture as a foundation for the study's approach.

Chapter II: Review of Literature

This chapter reviews previous research on horticultural crop production and marketing, focusing on grapes and pomegranates in India, particularly in Karnataka. It highlights prevailing trends, challenges, and existing knowledge gaps.

Chapter III: Methodology

This chapter explains the research design, data collection methods (surveys, interviews, and secondary sources), and analysis techniques. It emphasizes the importance of methodological rigor in ensuring reliable and valid results.

Chapter IV: Reflections from Field Survey

This chapter presents key findings from the field, focusing on the socio-economic impact of grape and pomegranate farming on local communities. It highlights changes in income, livelihoods, and social status.

Chapter V: Findings, Suggestions, and Conclusion

This chapter summarizes key insights and proposes strategies to improve production, marketing, and farmer profitability. It includes policy recommendations to enhance infrastructure, export potential, and sustainability in the horticulture sector.

HOPCOMS: Empowering Horticultural Producers in Karnataka

The Horticultural Producers Cooperative Marketing and Processing Society (HOPCOMS), established in 1965, facilitate the direct marketing of farm produce. Headquartered in Lalbagh, Bengaluru, HOPCOMS operates across Bangalore Urban, Bangalore Rural, Kolar, Ramanagara, Mandya, Mysuru, and Chikkaballapura districts.

Exploring Agricultural Dynamics: Area of Study

This research is a case study focusing on parts of Bagalkot District, Karnataka. The selection process involved two stages:

Selection of District: Bagalkot was selected due to its prominence in grape and pomegranate cultivation, ranking just behind Vijayapura in Karnataka.

Selection of Talukas: The study covers talukas with significant horticultural activity: Badami, Bagalkot, Mudhol, Jamkhandi, Bilagi, Hunagund, Rabakavi Banahatti, and Guledagudda.

Selection of Crops

In Bagalkot District, the choice of grape and pomegranate cultivation reflects both ecological suitability and economic viability. These crops thrive in regions with low rainfall and less fertile soils. Agronomists have identified them as sustainable alternatives that offer higher returns, particularly in drought-prone areas (Nagaveni et al., 2024).

Statement of the Problem

Grapes and pomegranates are commercially important horticultural crops in India. Their cultivation demands significant capital, timely operations, skilled labor, and effective management. Farmers face numerous challenges from planting to harvesting and marketing.

The profitability of these crops must exceed their costs to ensure economic and social benefits for cultivators. This study seeks to analyze the various issues confronting grape and pomegranate growers in Bagalkot District.

Research Gap

Despite the economic importance of grapes and pomegranates in Bagalkot, several issues remain underexplored. Smallholder farmers struggle with limited market access due to poor infrastructure and lack of reliable market information. Comparative analyses of marketing channels, profitability, and efficiency are scarce. Moreover, the effects of government schemes and subsidies, post-harvest practices, price volatility, and risk management strategies have not been adequately studied.

Objectives

- To examine trends and patterns of grape and pomegranate production in Karnataka
- To analyze the growth of horticultural production, particularly grapes and pomegranates, in Bagalkot District
- To assess the marketing practices for these crops in the study area
- To identify problems associated with the marketing of grapes and pomegranates
- To propose remedial measures and strategies for strengthening horticultural marketing

Hypotheses

- Large farmers possess greater knowledge of best practices in the cultivation of horticultural crops.
- Marginal and small farmers encounter more challenges in the marketing of horticultural crops.

Methodology of the Study

The present research adopts a descriptive and analytical approach to examine the production and marketing of horticultural crops, specifically grapes and pomegranates, in the Bagalkot district of Karnataka. The methodology involves a systematic analysis based on both primary and secondary data. This section outlines the time period, data sources, tools and techniques, selection of study areas, and limitations of the research.

Data Selection for the Study

A. Primary Data

Primary data were collected through a combination of structured and semi structured questionnaires, personal interviews, and direct field observations involving grape and pomegranate growers in Bagalkot district, Karnataka. The questionnaires were carefully designed to gather detailed information across various dimensions of horticultural practices. Emphasis was placed on collecting demographic and socioeconomic details such as age, education level, landholdings, and farming experience of the respondents. Additionally, the survey explored cultivation techniques, types of inputs used, and the scale of production in terms of yield and output volume. Special focus was given to marketing channels, ranging from direct sales in local markets to reliance on intermediaries, as well as the challenges encountered during both production and post-harvest stages. Economic aspects, including input costs, revenue patterns, and overall profitability, were also thoroughly investigated. Together, these data provide a comprehensive understanding of on ground realities and offer valuable insights into the socioeconomic conditions of horticultural farmers in the selected study areas.

B. Secondary Data Sources

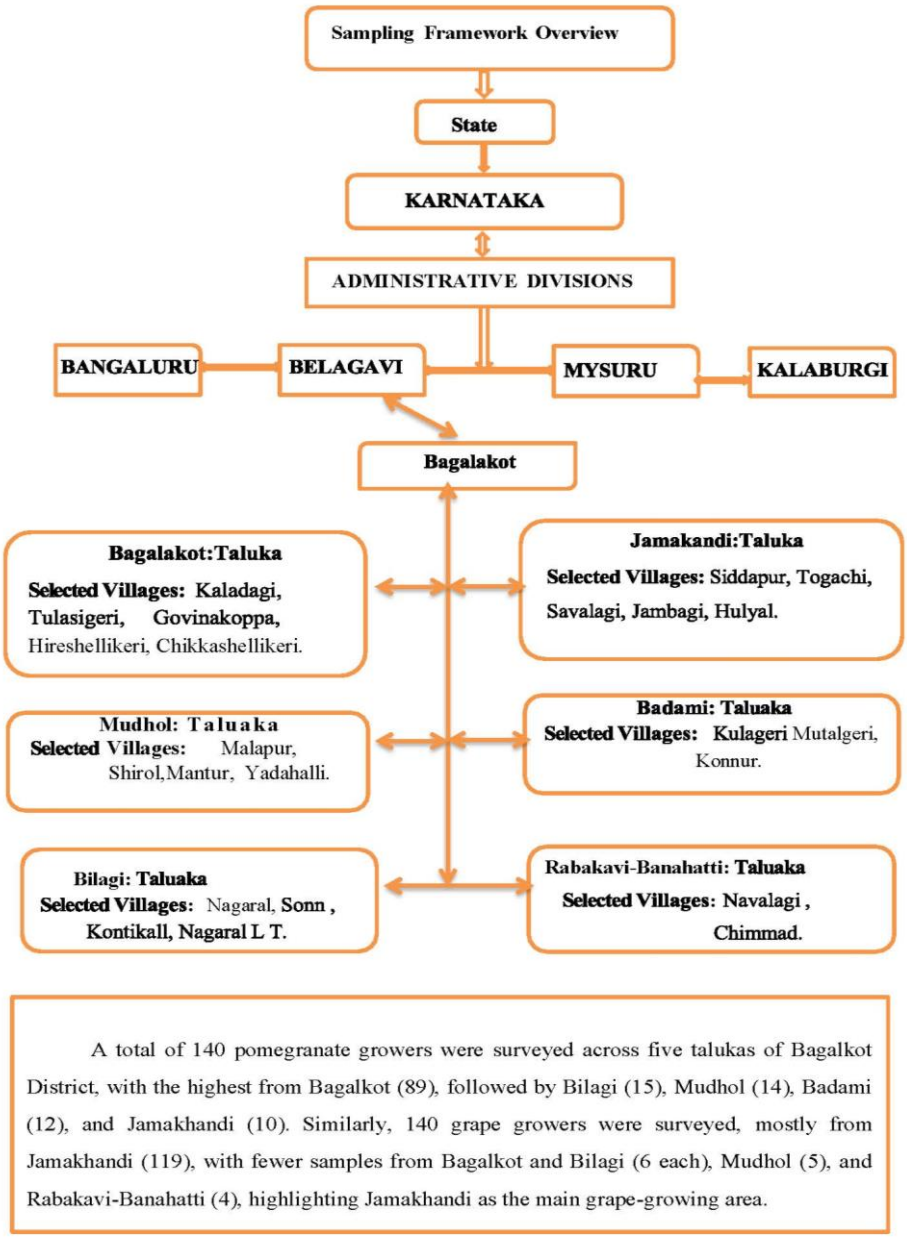
Secondary data were extensively gathered from a variety of credible and authoritative sources to support both the descriptive and analytical objectives of the study. Key among these were reports and publications from the Department of Horticulture, Karnataka, which offered detailed information on crop wise area, production trends, and relevant policy measures. Data from the University of Horticultural Sciences, Bagalkot, provided region specific insights on cultivation techniques and farmer behavior. Additionally, academic research papers, thesis works, and news articles were reviewed to understand theoretical frameworks and prior findings related to horticultural practices and marketing. Government documents such as the Agricultural Census and Annual Reports, particularly the 2022–23 report from the Department of Horticulture, Government of Karnataka, offered valuable statistical foundations to contextualize field data. Comprehensive statistics from the Horticulture Statistics Division, under the Department of Agriculture and Farmers Welfare, were also instrumental in analyzing broader trends and patterns.

Sampling Method of the Study

A. Selection of Study Areas

The sampling frame for this study comprises a comprehensive list of villages located within selected talukas of Bagalkot district, Karnataka. These talukas were chosen based on their significant involvement in the cultivation of grapes and pomegranates. Within this frame, specific villages were selected based on their recognized prominence and concentration of growers engaged in the cultivation of these two crops.

B. Sampling Framework Overview



A total of 140 pomegranate growers were surveyed across five talukas of Bagalkot District, with the highest from Bagalkot (89), followed by Bilagi (15), Mudhol (14), Badami (12), and Jamakhandi (10). Similarly, 140 grape growers were surveyed, mostly from Jamakhandi (119), with fewer samples from Bagalkot and Bilagi (6 each), Mudhol (5), and Rabakavi-Banahatti (4), highlighting Jamakhandi as the main grape-growing area.

Selection of Sample Villages for Pomegranate Growers across Talukas in Bagalkot District

Taluka	Selected Villages	Samples
Bagalakot	Kaladagi[15] Tulasigeri [10] Govindakopp [40] Hiresellikeri [15] Chikkashellikeri [09]	89
Jamakandi	Siddapur [05], Togachi [02], Savalagi [03],	10
Mudhol	Malapur, [03] Shirol [05], Mantur, [03] Yadahalli [03]	14
Bilagi	Nagaral [04], Konttikal [03], Sonna [04], Nagaral L.T. [04]	15
Badami	Kulageri [04], Konnur [04], Mutalgeri [04],	12
	Total	**140**

Sources: *Field survey*

The selection of sample villages for pomegranate growers across different talukas in the Bagalkot district has been carried out strategically to ensure a representative distribution. In the Bagalkot taluka, five villages were selected: Kaladagi with 15 samples, Tulasigeri with 10, Govindakopp with 40, Hiresellikeri with 15, and Chikkashellikeri with 9, totaling 89 samples. From the Jamakandi taluka, three villages were selected Siddapur with 5 samples, Togachi with 2, and Savalagi with 3 making a total of 10 samples.

In the Mudhol taluka, samples were taken from Malapur (3), Shirol (5), Mantur (3), and Yadahalli (3), adding up to 14. The Bilagi taluka included villages such as Nagaral (4), Konttikal (3), Sonna (4), and Nagaral L.T. (4), totaling 15 samples. Finally, in the Badami taluka, the selected villages were Kulageri, Konnur, and Mutalgeri, each contributing 4 samples, summing up to 12.

Table 3.8: Taluka-Wise Selection of Villages for Grape Grower Samples in Bagalkot District

Taluk	Selected Villages	Sample
Bagalakot	Kaladagi [03] Chikkasellikeri [01] Hiresellikeri [02]	06
Jamakandi	Jamakandi [15] Siddapur [18] Savalagi [55]Togachi [10] Jambagi[12]Hulyal [09]	119
Mudhol	Malapur [01] Shirol[03]Mantur [01]	05
Rabakavi-Banahatti	Navalagi [02]Chimmad [02]	04
BIlagi	Nagaral [02] Sonn [02]Nagaral, L. T. [02]	06
	Total	**140**

Sources: *Field survey*

The selection of sample villages for grape growers across various talukas in the Bagalkot district was carried out to ensure balanced and comprehensive representation. In Bagalkot taluka, three villages were selected, contributing a total of 6 samples: Kaladagi (3), Chikkasellikeri (1), and Hiresellikeri (2). Jamakhandi taluka recorded the highest number of samples, with 119 collected from six villages Jamakandi (15), Siddapur (18), Savalagi (55), Togachi (10), Jambagi (12), and Hulyal (9). In Mudhol taluka, 5 samples were gathered from Malapur (1), Shirol (3), and Mantur (1).

Rabakavi-Banahatti taluka contributed 4 samples, with 2 each from Navalagi and Chimmad. Lastly, Bilagi taluka provided 6 samples, drawn equally from Nagaral, Sonna, and Nagaral L.T. (2 samples each). In total, 140 samples were collected across the talukas, ensuring a diverse and representative selection of grape growers in the Bagalkot district.

B. Sample Size

A total of 280 samples were selected for the study, comprising 140 grape growers and 140 pomegranate growers. The growers were proportionally selected from the sampled villages across different talukas, ensuring adequate representation of each subgroup based on crop type and geographic location.

Sampling Frame and Technique

The study involves selecting sample villages from different talukas in Bagalkot district. The sampling technique used is stratified random sampling, ensuring representation from all relevant talukas.

A. Sampling Technique

To ensure a representative and unbiased sample, stratified random sampling was employed. The population was first divided into distinct strata based on talukas within Bagalkot district, with each section representing a taluka known for significant grape and pomegranate cultivation. Within each level, villages were randomly selected, followed by the random selection of individual farmers from these villages. This approach ensures proportional representation of growers across different talukas, thereby enhancing the generalizability and validity of the study findings.

B. **Stratified Random Sampling**:

This technique involves dividing the population into distinct subgroups (strata) based on certain characteristics, in this case, the different talukas within Bagalkot district that have significant Grapes and Pomegranate cultivation. From each stratum, a random sample is selected to ensure that each subgroup is adequately represented in the overall sample.

C. Tools and Techniques

The data analysis was carried out using the statistical software IBM SPSS Statistics Version 24. The tools used for analysis included Simple Averages, Ratios, Percentages, Compound Annual Growth Rate (CAGR), and Average Annual Growth Rate.

Scope of the Study

The scope of this study encompasses a comprehensive examination of grape and pomegranate cultivation in Bagalkot district, with a specific focus on their economic and marketing dimensions. The research is designed to assess the cost structure associated with plantation establishment and maintenance, including expenditures on land preparation, irrigation, fertilizers, pesticides, and labour. This cost analysis is essential for evaluating the economic viability of horticultural investments in the region.

Further, the study undertakes a detailed profitability analysis, comparing production costs with income generated from fruit sales. It also investigates factors influencing profitability, such as fluctuations in market prices, yield variability, seasonal risks, and post-harvest losses. In addition, the study explores the marketing systems adopted by growers covering distribution channels, the role of mediators, pricing mechanisms, transportation, and logistical challenges. Overall, the research aims to generate actionable insights and strategic recommendations for farmers, and policymakers to enhance sustainability in agriculture, income, and market competitiveness in the horticulture sector of Bagalkot district.

Limitations of the Study

The study has certain limitations that should be acknowledged. Firstly, the findings may not be applicable to other regions or districts due to the unique agro-climatic and socio-economic conditions prevailing in the Bagalkot district. Secondly, the study focuses exclusively on grape and pomegranate growers, and does not include other horticultural crops, which limits the scope of the analysis. Lastly, the inclusion of an additional district could have provided a comparative perspective, which is another limitation of the study.

Major Findings of the Study

- The majority of respondents in Bagalkot are Hindu (57%), followed by Muslims (34%), and others (9%) This religious distribution reflects the demographic makeup of Bagalkot. Understanding this is crucial for designing inclusive agricultural programs that cater to the socio-cultural dynamics of the region.
- The largest group of respondents belongs to the OBC category (43%), followed by SC (25%), ST (16%), and GM (16%). The diverse caste representation highlights the need for inclusive policies that address the unique challenges faced by different social groups to ensure equitable development.
- There is a significant male dominance among respondents in Bagalkot (78.5% male, 21.5% female). This disparity indicates the underrepresentation of women in agriculture, emphasizing the need for gender-sensitive policies to enhance female participation and support in farming activities.
- Nearly half of the respondents in Bagalkot (47.5%) have small families (1-3 members), with fewer having larger families. Smaller family sizes may influence labor availability for farming, suggesting the importance of policies that support adequate labor and resource allocation for these households.
- A relatively young population is observed among respondents in Bagalkot, with the largest group being 20–30 years old (35.5%). The youthful demographic suggests a dynamic workforce capable of adopting new agricultural technologies and practices, which can drive long-term agricultural development.
- A majority of respondents in Bagalkot are married (67%). Married individuals often have more stable family structures, influencing long-term agricultural planning. Support programs should consider family dynamics to provide appropriate assistance.
- The majority of both pomegranate (57.14%) and grape (55.17%) farmers in Bagalkot are marginal farmers. The prevalence of small landholdings indicates the need for support programs to enhance productivity and access to resources for these farmers, who form the backbone of the agricultural sector.
- Bore wells (30.5%) and canals (21.5%) are the most common irrigation sources in Bagalkot. The reliance on diverse water sources underscores the necessity for integrated water management policies to ensure sustainable and reliable irrigation.

- Most farmers in Bagalkot do not practice certified organic or sustainable farming (85.5% for grapes, 88% for pomegranates). Promoting sustainable farming practices can improve soil health, reduce chemical usage, and increase market value, suggesting a significant area for development.
- A significant portion of farmers in Bagalkot have 3-5 years of experience (43% for grapes, 50% for pomegranates). The presence of experienced farmers highlights the potential for advanced training to further enhance skills and productivity, while less experienced farmers may need foundational support.
- Around 36.42% of grape farmers have small land holdings, often below 1 hectare, leading to low yield and limited production.
- Form Farmer Producer Organizations (FPOs) Helps small farmers pool resources, reduce costs, and access larger markets for better profits.
- Adopt High-Density Planting: Increases yield and land-use efficiency by optimizing plant spacing and using improved varieties.
- About 7.14% of grape farmers lack technical know-how, affecting yield and quality.
- Attend Training Workshops: Participate in agricultural training programs on modern grape cultivation, pest control, and post-harvest management.
- Exchange knowledge and experiences with fellow farmers through local farmer groups or FPOs.
- Develop Farmer-Friendly Digital Platforms Launch mobile apps or helplines providing technical guidance in local languages.
- Promote Public-Private Partnerships(PPP) Encourage collaborations with agree-tech companies to provide hands-on training and demonstrations.
- Around 15.0% of grape farmers face high disease incidence, leading to reduced yield and quality.
- About 8.57% of grape farmers report using fake or poor-quality seeds/plants, resulting in lower productivity
- Around 27.85% of grape farmers face lack of finance, affecting their operations.

- Join Farmer Producer Organizations (FPOs) Pool resources to access bulk credit, subsidies, and institutional support.
- Around 5.0% of grape farmers lack adequate water facilities, impacting production.
- Harvest Rainwater Build small farm ponds or tanks to collect and store rainwater for irrigation use.
- About 29.28% of pomegranate farmers have small land holdings, limiting overall production.
- Cooperative Farming Encourage smallholder farmers to form cooperatives to collectively invest in modern farming techniques, equipment, and marketing.
- Training and Extension Services: Provide training and extension services on efficient farming practices and management to enhance productivity per unit area.
- About 5.71% of pomegranate farmers lack technical know-how. This impacts yield and crop quality.
- Learn from Krishi Vigyan Kendras (KVKs). Engage with local KVKs for expert advice, crop management tips, and technical guidance.
- About 34.28% of pomegranate farmers face pest and disease issues. This leads to reduced yield and poor fruit quality.
- Set Up Mobile Plant Clinics Establish diagnostic services in farming regions to provide immediate solutions.
- About 5.0% of pomegranate farmers use fake seeds. This results in poor plant health and low productivity.
- Approximately 14.28% of pomegranate farmers face financial constraints, hindering investment in essential inputs. This limits their capacity for optimal production.
- Diversify Income Grow additional crops or engage in allied activities (e.g., beekeeping).
- Use Government Schemes Apply for subsidies, crop insurance, and input support programs.
- About 5.0% of pomegranate fruits suffer from cracking and damage, leading to spoilage and diminished market value.

Farmers Suggestions for Improving Grapes and Pomegranates Yields

- Established on survey data, farmers recommend improved varieties, pest control, timely harvesting, and sustainable soil and nutrient practices to enhance grape yield and quality.
- Strengthen Pest and Disease Control (27.14%) Integrated Pest Management (IPM) is crucial for maintaining vine health. By combining biological, cultural, and chemical strategies, farmers can reduce pest damage; prevent yield loss, and lower dependency on harmful chemicals.
- Adopt High-Yield, Disease-Resistant Varieties (17.85%). Improved grape varieties not only boost yield per acre but also resist common diseases. This reduces the need for frequent spraying, saving on input costs and ensuring healthier, more market-ready grapes.
- Follow Sustainable Farming Practices (15.71%) Sustainable practices like organic composting, water-saving irrigation, and crop rotation help maintain soil health and reduce long-term costs. They also promote consistent production and environmental balance.
- Practice Cluster Thinning (12.14%). Removing excess grape clusters ensures better sunlight exposure and nutrient allocation. This improves grape size, colour, and sweetness key factors for higher market value.
- Pest and Disease Management (40.00%) – Most farmers emphasize integrated pest management (IPM) to control pests effectively while reducing chemical use, ensuring healthier trees and safer produce.
- Choose High-Yielding, Disease-Resistant Varieties (24.28%) – Selecting improved varieties helps boost fruit production and minimize crop loss due to disease.
- Pruning and Training (8.57%) –Regular pruning improves canopy structure, airflow, and fruit quality, while also lowering disease risk.
- Sustainable Farming Practices (7.85%) – Organic methods and reduced chemical inputs support.

Strategies to Increase Grape Crop Value: Farmers Views

- Minimum Price Support (29.28%). Farmers urge the government to introduce an MSP for grapes to protect against price crashes and stabilize income.
- Reduce the Role of Middlemen (25.71%). An encouraging direct sale through FPOs or cooperatives helps farmers retain more profit and ensures fair pricing.
- Increase Cold Storage Units (22.85%) More cold storage near farms can reduce spoilage and allow farmers to wait for better prices.
- Promote Direct Marketing (15.00%). Selling directly to consumers via markets or FPOs increases farmer profits and customer engagement.

Approaches to Increase Pomegranate Crop Value: Farmers Views

- Reduce Dependence on Middlemen (29.28%) By joining FPOs or selling directly, farmers can earn more and gain pricing control.
- Minimum Price Support (22.85%) An MSP for pomegranates would ensure financial stability and encourage continued cultivation.
- Direct Marketing (15.71%) Farmers selling directly to consumers benefit from higher profits and brand trust.
- Increase Cold Storage Units (12.85%) More storage facilities would reduce post-harvest losses and improve market timing.

Conclusion

The horticultural sector plays a pivotal role in enhancing agricultural productivity and supporting rural economic development, particularly in regions like Karnataka where favourable climatic conditions and fertile soil contribute to the success of high value crops. This study examines the evolution and current dynamics of horticultural practices with a focus on grape and pomegranate cultivation in Bagalkot district, a leading area in the state's horticultural landscape. Over the years, Karnataka has emerged as a frontrunner in horticultural development due to its innovation in farming techniques and government support. Bagalkot, with its thriving grape and pomegranate farming communities, showcases the opportunities and challenges that define modern horticulture in India.

The research findings reveal significant gaps in knowledge, resources, and infrastructure, particularly between small and large scale farmers. While large farmers have better access to technology and markets, small and marginal farmers face numerous challenges, including limited landholding, inadequate irrigation facilities, lack of technical

knowhow, and restricted access to institutional credit. These limitations contribute to lower productivity and income instability. Targeted interventions such as the formation of Farmer Producer Organizations (FPOs), adoption of high density planting, and cooperative farming can help bridge these disparities. Financial support in the form of subsidies, crop insurance, and simplified loan schemes is essential to enable small farmers to invest in infrastructure and modern farming inputs.

Marketing emerges as one of the most critical issues faced by farmers. A large proportion of grape and pomegranate farmers are dependent on middlemen, which results in reduced profit margins and high vulnerability to price fluctuations. The lack of cold storage facilities and proximity to local markets further compounds these problems. Strengthening market linkages through digital platforms, direct marketing initiatives, and cold chain infrastructure can significantly boost farmer profitability. Export potential remains high for grapes, especially in the northern taluks of Bagalkot, while pomegranates primarily serve domestic markets. Efforts to enhance processing, storage, and market intelligence are crucial for sustaining competitiveness.

The study also highlights a demographic trend where middle aged farmers with moderate education levels dominate the horticultural sector. These farmers bring a mix of traditional knowledge and openness to modern practices, indicating a promising foundation for innovation. Most belong to nuclear families, allowing for efficient labor distribution across farm operations. Irrigation is primarily borewell based, but there is increasing adoption of drip irrigation, which points to improved water management and sustainability. Cropping patterns are largely monocropping, driven by soil and climatic suitability, with a notable shift toward integrated pest management, balanced fertilizer use, and organic inputs, especially for export oriented grape cultivation.

Despite the relatively high input costs especially for grape farming the benefit cost analysis demonstrates that both grape and pomegranate cultivation can be economically viable and profitable when supported by scientific methods and institutional backing. Challenges such as pest and disease outbreaks, fake seed usage, post-harvest losses, and inadequate technical knowledge still affect productivity and quality, underscoring the need for continuous capacity building and support. Training programs, skill development schemes, and public private partnerships can play a vital role in enhancing farmer capabilities and access to innovations.

In conclusion, this chapter has provided an in depth overview of the methodology, findings, and implications of the study on horticultural crop production and marketing in Bagalkot. By addressing key production and marketing constraints and leveraging the

strengths of the district's horticultural base, the region has the potential to emerge as a model for sustainable high value agriculture. The insights derived from this research offer valuable direction for policymakers, agricultural institutions, and farmers alike to enhance productivity, ensure fair pricing, and promote economic resilience in the horticultural sector.

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